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INPI (National Institute of Industrial Property)

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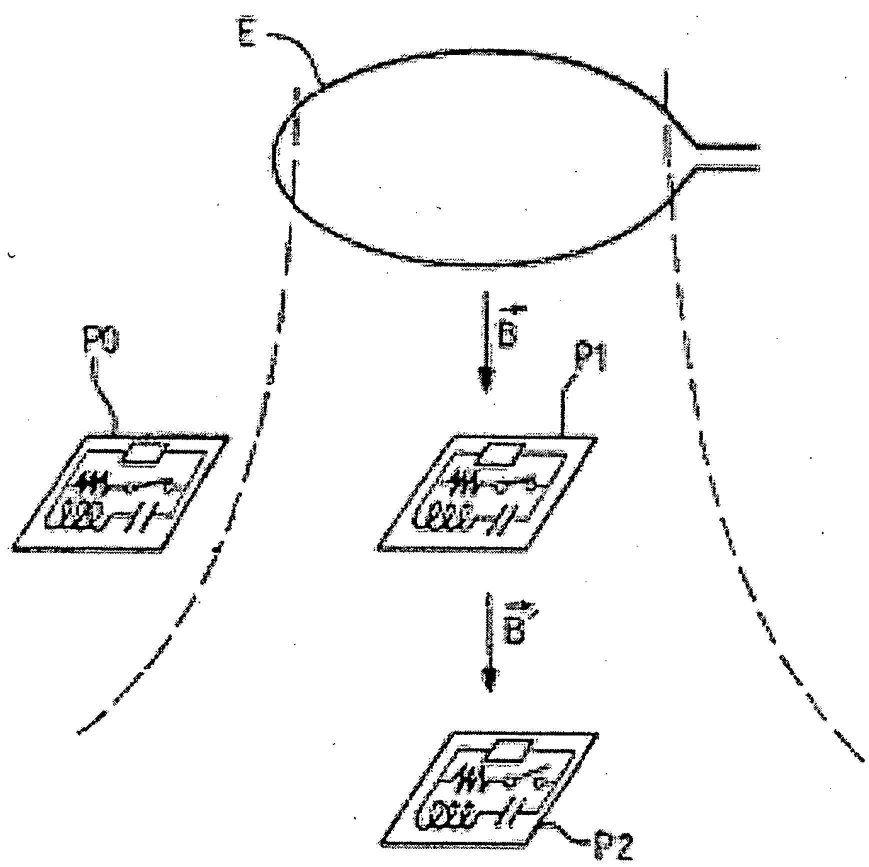
Pertinent Documents		Pertinent Claims	Classification attributed to the invention by the INPI
Category	Citation of the document with indication, if necessary, of pertinent parts		
A	EP 0 638 819 A (Texas Instrument, Deutschland GMBH) Abbreviation, Figures 1,2 Column 9, lines 23-44 Column 11, line 42 Column 12, line 14	1, 4, 7, 8, 10	
A	US 5 287 112 A (Shuermann) Abbreviation, Figure 1	1,4	
A	EP 0 681 192 A (Texas Instrument, Deutschland GMBH) Abbreviation, claims 1,2 figures 1,2	1	
A	WO 89 10030 A (UNISCAN LTD) Abbreviation, figures 20, 20A, 20C Page 16 lines 8-line 27 Page 23 Lines 28-32		
	Search Completion Date: September 15 1997	Examiner Danielidis S.	Technical Domain searched : G01S G06K
X : pertinent to at least one claim or general technical background			

Radio-electric transponder equipped with an antenna and a frequency detuning circuit

Abstract:

The invention relates to radio transponders (P0, P1,P2) detectable and/or interrogated by an adapted radio system.

The invention necessitate that the transponder can be detuned in frequency or mismatched in impedance such that the transponder P1 absorbs less radio field B and energy and that another transponder P2 located near receives sufficient radio field B' to be able to function in a normal fashion.



The present invention relates to the domain of detection and/or interrogation of radio-electric transponders by means of a detection system and/or an adapted radio-electric reader. Such transponders are used in particular to detect or identify mobile objects in which these transponders are located.

Such systems can in particular be used to recognize badge carrying individuals, badge carrying cars for toll road fees, or labeled merchandise in a supermarket.

A transponder is an emitter-receiver (transmitter-responder) that responds automatically to an external signal of an emitter of a detection system.

The radio-electric transponders called badges for some applications, or labels, are also designed to transmit over some distance information in response to signal of an emitter of an interrogation system.

In the following description, the term radio-electric will be abbreviated under its common form "radio".

The detection and/or interrogation system of known radio transponders comprises an emitter/receiver E and transponders T1, T2 as indicated in figure 1.

The emitter/receiver E generates a radio field B (or electromagnetic field). When a transponder T1 happens to be inside the boundaries of the field B, the transponder detects the field and signals its presence to the emitter receiver E.

Very often one uses so called "active" transponders that re-emit a radio signal called response signal directed to the emitter/receiver E. The response signal can comprise information enabling the identification the transponder and/or the object in which it is located.

To re-emit a radio signal, active transponders can comprise an autonomous source of power. But in preference, the transponder recuperates the power of the radio field B to feed its own electronic circuit. To fully detect the field or the radio signal, the transponder comprises a radio antenna. The antenna is made of, for instance, a metal coil and a printed circuit which adds the advantage of reduced dimensions of the transponder.

Some transponders, Called "Passive" comprise just a short circuited metal loop. The presence of such transponder in the field of an emitter E, such as represented in figure 1, of a loop traversed by a current, modifies the reciprocal induction of the emitter E loop and the transponder T1 loop.

This system of passive emitter and transponder is thus analogous to the primary and secondary circuit of an electrical transformer. The emitter/receiver E can in this manner detect the presence of the transponder T1 in its field by detecting a modification of its induction current.

Additionally, there are transponder transmission systems in which a radio emitter sends information that can be registered on an electronic chip contained in the transponder.

In general the present application aims at every transponder detection and/or interrogation system, the transponders being able to be detected or interrogated or even registered by the emitter/receiver. The term emitter/receiver means in general any device capable of emitting a radio field and detecting or interrogating transponders present in the field, the device being preferably capable of receiving a response radio signal coming from one of the transponders.

Some difficulties arise when several transponders are present at the same time inside the boundaries of field B. The transponders all respond then at the same time to the stimulation of field B or they do not respond.

To avoid this confusion, it was proposed to sequence the transponders responses. Each transponder responds then to the stimulation of an initialization signal of the emitter after a random time.

However, in numerous cases, there some transponders that do not respond to the stimulation of the radio field B or radio signal. They seem to be inhibited.

This non resolved problem was mentioned in the document FR-A-2 717 593. One notices the fact that "2 close labels can be in the filed of the same reader, a thing that can cause their mutual automatic inhibition.

One of the objects of the invention is to optimize the detection and/or the interrogation of multiple transponders present in the field of the detector and/or reader E.

Another object of the invention is to avoid the perturbations of the normal functioning of the transponder caused by the proximity of the other transponders.

An explanation of the mutual inhibition of the transponders is that a transponder provokes a radio shadow effect seen in figure 1, such that another transponder located in the shadow does not receive enough field or power to function correctly.

According to the invention, these objects are achieved by requiring that the antenna of a transponder can be frequency detuned or impedance mismatched in such a manner the transponder and its electronic circuit absorb less radio field and less power.

In this manner, another transponder located in the proximity of the mismatched or detuned transponder can receive sufficient radio field or power to function correctly.

The transmission system can then detect or consult the other transponder as if it was alone in the field B of the emitter.

Preferably, the invention relates to a transponder being presented to a radio-electric field of a predetermined frequency, said transponder comprises an antenna able to receive the radio-electric field of the predetermined frequency and an electronic circuit coupled to the antenna , said circuit capable of absorbing and restituting the energy supplied by the field received by the antenna , characterized by the fact that the transponder comprises means of mismatching the reception of a radio-electric field of a predetermined frequency and means of matching a reception of a radio-electric field of the predetermined frequency, the means of matching being realized when the transponder is in a selected state, the means of mismatching of mismatching being realized when the transponder is in a non selected state in order to limit the absorption of power and/or of the field by the transponder in the non selected state.

Preferably, the invention is realized by anticipating that the means of matching enable the tuning the antenna according to the predetermined radio-electric frequency and that the means of mismatching enable the detuning of the antenna with respect to the predetermined frequency.

A first mode of practice of the invention anticipates that the means of mismatching and/or matching consist of modifying a capacitance value with the antenna having an inductance such the matching frequency of the antenna is modified with respect to the predetermined frequency of the radio-electric signals.

A second mode of practice anticipates that the means of matching and/or mismatching enable the modification the matching of impedance between the antenna and the electronic circuit.

In an example of the second mode of practice, the means of matching and/or mismatching consist in modifying the charge value and/or resistance in order to modify

the value of the impedance of the antenna and/or the value of the impedance of the electronic circuit.

In this manner, according to a characteristic, when two transponders are presented to a radio-electric field, each of the transponders receives the radio-electric field and/or the predetermined frequency signals no matter what the position of the transponder with respect to the other transponder, each transponder comprising the means of matching and mismatching to avoid the radio-electric perturbations caused by the proximity of the other transponder.

According to another characteristic, the transponders go into a selected state in turns, a single or a small number of transponders are in a selected state at the same time.

According to another characteristic, a transponder goes into a selected state during a period of time corresponding to temporary inhibition of the transponder.

The invention also anticipates transmission systems matched to the transponders.

The invention will be better understood after reading the description and inspection of the drawings that follow that are given as non limiting examples.

- Figure 1 represents a schematic of the principle of the transmission system with a transponder according to the state of the art.

- Figure 2 represents a schematic of the principle of the transmission system with a transponder according to the invention.

- Figure 3 represents a schematic of the transponder circuit according to a first mode of practice of the invention.

- Figure 4 represents a schematic of the transponder circuit according to a second mode of practice of the invention.

Figure 1 illustrates two classical transponders T1, T2 present in the field B of an emitter/receiver E. The transponder T1, in direct view of the emitter E receives the field B correctly. The radio field supplies it with the power to function and signal its presence to the emitter/receiver E and eventually transmits to it radio signal in response. In the setup of figure 1, the transponder T1 is intercalated between the emitter E and the transponder T2 that receives with difficulty the radio field B'.

The radio field B and its power are in fact absorbed by the transponder T1 that forms somehow a radio screen. This effect of radio shadow often interferes with a good

detection of the transponder T2, the latter not receiving enough radio field and power to function correctly.

One sees in general an attenuation effect or reciprocal inhibition when the classical transponders are near each other such that the transponders are not correctly detected or cannot communicate a response to the emitter/receiver.

The classical transponders having in preference reduced dimensions, makes the specialist elaborate antennas particularly tuned to the frequency of the radio field that the antenna should receive and perfectly matched in impedance to the electronic circuit served by the antenna.

In a surprising manner, the invention anticipates means of mismatching of the antenna of a transponder to limit the field absorption by the transponder when it is not selected. A neighbor transponder can then receive the radio field correctly and can be detected and communicate with the emitter/receiver. It is then anticipated that there will be means of matching the antenna of this transponder so that it receives enough field.

In figure 2, similarly to figure 1, one sees two transponders P1 and P2 placed in the radio field B emitted by the emitter/receiver E.

One considers in the example of figure 2 that the antenna of the transponder P1 is mismatched, that is it absorbs little or no field B. At the level of transponder P2, the radio field B' will then have a normal power as if the transponder P1 was not there. The transponder P2 receives then sufficient power to function and be detected and respond to the emitter/receiver E.

The radio shadow effect or radio screen caused by the transponder of the state of the art is the suppressed or annulled (Compare to figure 1).

An example of means of mismatching of the antenna of a transponder consists of detuning the antenna with respect the frequency of the emitter field, this frequency is denoted fe.

The antenna of a transponder is generally made of a resonant circuit comprising an inductance and a capacitance as illustrated in figure 3. The inductance L can then be made in the form of helical coils. The capacitance C can be made of a unique condenser. It is preferably made of by a group of condensers C1, C2 connected in parallel such that the capacitance of each of the condensers C1, C2 is additive.

The well known resonance frequency of such circuit is determined by the product of the inductance L by the capacitance C.

A means of mismatching the antenna consists of tuning the antenna to a resonance frequency fd different from the frequency fe of the radio field or the radio signals transmitted to the transponder. This way the antenna of the transponder is detuned with respect to the frequency fe transmitted. The transponder and its antenna thus absorb weakly the field or signal of the emitter.

Inversely, the invention anticipates means of matching the antenna of a transponder. These means of matching enable the transponder to receive enough field or radio signal in case of need, in particular, when the transponder is selected. The first mode of practice anticipates the matching of the antenna by tuning the resonance frequency of the antenna with the frequency fe of the field or signals transmitted.

As illustrated in Figure 3, the means of tuning of the resonance frequency of the antenna comprise advantageously a variable capacitance. The variable capacitance is obtained according to the example in figure 3 with a condenser V1 connected via a switch I1 in parallel with the condensers C1 and C2. When the switch I1 is closed, the capacitance C of the resonant circuit is then:

$$C= C1 + C2 + V1$$

Where C1, C2, V1 are the values of the capacitance of the condensers C1, C2 and V1 respectively.

The resonance frequency fa of the matched antenna is then determined by the following product:

$$L.C = L.(C1+C2+V1)$$

The matched frequency of the antenna fa will the be different from the frequency fd of the mismatched antenna and determined by the following product:

$$L.C = L.(C1+C2)$$

The frequency fd will then be correctly shifted with respect to the frequency fa by suitably choosing the value of the capacitances C1, C2 and V1.

For instance, if the frequency fe of the transmitted field or radio signal is 130 kHz, the antenna will be tuned to the frequency fa of 130 kHz by choosing the following values of its components:

-An inductance L of 1 μH

-Identical condensers C1, C2, V1 of 0.5 μF.

The product of the values of the inductance and capacitances is then:

$$L.(C1+C2+V1) = 1.5x10^{-6}\ s^2$$

This product corresponds to a resonance frequency of 130 kHz.

The means of mismatching of the antenna can consist in a simple manner of disconnecting the condenser V1 by opening the switch I1. The product of the values of the inductance and the capacitance of the mismatched antenna is then:

$$L.(C1+C2) = 1.1x10^{-6}\ s^2$$

This product corresponds to a resonance frequency fd of the mismatched antenna of about 160 kHz. The antenna being matched to a frequency fd shifted from the frequency fa of the field or signals transmitted by the emitter will receive little of the transmission and will not interfere with the reception of the field or signals by a neighbor transponder.

Figure 2 illustrates this situation in which two transponders T1, T2 are located in the field of the emitter E. By considering that the transponder P1 is in a mismatched state, one sees that the field B is correctly transmitted to the transponder P2 even when the transponder P1 is present.

In an equivalent manner, the tuning of the antenna can be obtained when the switch I1 is open, the values of the inductance L and condensers C1 and C2 correspond then to the frequency fe of the emitter. The antenna is mismatched by closing the switch I1, that is, by connecting the condenser V1 or else by connecting several condensers V1, V2 by the intermediary of several switches I1 and I2.

It is preferable that the resonance frequency fd of the mismatched antenna is close to the emitter frequency fe and that thus of the resonance frequency fa of the matched antenna. In fact, the mismatched antenna receives thus little field or signal. The transponder disposes then of a week power but enough to drive the means of matching, such as the switch I1 and become matched. This effect can be advantageously used to activate the transponders in turn as we will see later.

A second mode of practice of the means of mismatching of the antenna of the transponder consists of achieving a mismatching of impedance between the antenna and the electronic circuits D of the transponder.

The antenna of a transponder presents in fact some impedance to the frequency fe of the transmitted field or signals.

For the electronic circuit D served by the antenna receives enough power and signal one achieves classically an impedance matching, that is, the electronic circuit is calculated and is adjusted to present an input impedance sensibly identical to the impedance of the output of the antenna, for electronic signals having predetermined frequencies fe.

Figure 4, enables one to better understand the second mode of practice. It shows a transponder analogous to the one in figure 3 in which a resistance R is connectable in the antenna circuit to achieve a mismatching of the impedance. The antenna comprises an inductance L and condensers C1 and C2, the capacitance of the condensers being fixed in this example of the second mode of practice. The resonance frequency of the antenna determined by the product of the values of the inductance and the capacitance (L.C) is thus fixed and corresponds to the frequency fe of the transmitted field and signals. In this second mode of practice there is no frequency mismatching. A switch I enables the connection of the resistor R in parallel with the components L, C1, C2of the antenna and the electronic circuit D'

The value of the resistance R is chosen so as to vary the impedance of the antenna or the value of the impedance of the electronic circuit D, the value of the resistance R is preferably small. The value of R can be in its extreme case zero, the means of mismatching becomes the short circuiting of the antenna and the transponder not absorbing neither power nor field.

In use, the antenna receives normally the field or signals of frequency fe.

When the switch I is closed, the resistor R varies the impedance L, C1, C2 of the antenna, the antenna is mismatched impedance with respect to the electronic circuit.

In such mismatched state, the electronic signals and the power received by the antenna are weakly transmitted to the electronic circuit. The antenna of the transponder absorbs then little or no field or transmitted signals.

In the matched state, according to this second mode of practice, the switch I is open and the resistor R is disconnected form the circuit. The antenna L, C2, C2 presents then a matched impedance to the impedance of the electronic circuit D served by the antenna. The antenna transmits then enough signal and power that it receives to the electronic circuit D. The transponder absorbs then the field B and the power. In this manner it can be detected correctly by the emitter/receiver E, the latter detecting the absorption of the field. According to a variation, the transponder uses the power absorbed to re-emit a strong response signal towards the emitter/receiver E.

Other modes of practice of the controlled matching/mismatching of impedance can be considered without deviating from the framework of the current invention. The use of a quarter wave line, an impedance transformer … are for instance two of a number of means of matching and/or mismatching of impedance available to the one skilled in the art.

More broadly, other means of mismatching and matching to the transmission of the field or signals well known to the one skilled in the art can be considered in an equivalent manner.

In the following description, we will use the expression of "matched transponder" to designate a transponder whose antenna is in a matched state, one of the precedent means of matching to the transmission of the radio field or signals is then achieved.

In the opposite case,We will talk of "mismatched transponder".

The operation of a number of transponders as well as the transmission protocols of system of transponders, according to the invention, will now be described, which will permit the use of other advantages of the invention.

When the transponders are not in use, outside of the field B, are preferably in a mismatched state.

In this manner, when several transponders enter simultaneously in the field B, each transponder can the go into a matched state thus become detected or interrogated by the emitter/receiver without perturbation by the all the other mismatched transponders.

In the mismatched state, it is anticipated that a transponder receives a small amount of field or power. The transponder then has a its disposal a minimum power necessary to go from a mismatched state to a matched one by for instance activation the switch I, I1, I2.

This condition is easily achieved because an antenna matched to a frequency slightly shifted from the frequency of the transmitted field receives always a small amount of field and power. Also, an impedance mismatching between the antenna and the electronic circuit always enables a weak transmission of radio signal and thus of power.

A first detection/interrogation protocol anticipates that a transponder goes into a matched state randomly. If the time interval during which the transponder remains in the matched state is reduced, the probability that two transponders become matched at the same time is weak. One obtains thus advantageously a good detection or good response of the transponders.

The steps of the reading steps are then:

- The transponders are initially mismatched

- Among the transponders present in the field, thus receiving a small amount of power, a transponder passes into a matched state randomly.

- Radio signals are exchanged between this matched transponder and the emitter/receiver E.

- This transponder becomes again mismatched.

A second protocol consists of anticipating that a transponder passes into a matched state after receiving an adequate command signal form the emitter E.

The transponders can then be activated in turn one transponder being matched at a given time.

One can also anticipate that all the transponders are in a matched state when they are not in use. In this third protocol, the emitter can then send a command instructing a transponder to go into a mismatched state. The emitter can thus deactivate all the

transponders that are present in its field except one. The step of signal transmission between the emitter and this selected transponder can then run its course.
After this exchange, the emitter activates another transponder.
And so on until the emitter has interrogated each transponder present in its field.

This instruction by the emitter is preferably combined with a known identification protocol of the code of a bit by bit transponder.

One can then use a detection/interrogation protocol in which the protocol starts with an initialization signal of the emitter/receiver, each transponder re-emitting an acknowledgement signal after a time interval corresponding to an element of its identification code.

Such protocols and systems of detection/interrogation are for instance described in the patent EP-B-0 495 708 in the name of the inventor of which the description is incorporated herein.

The invention anticipates also, a detection and/or interrogation system of transponders comprising a radio-electric emitter/receiver and a plurality of transponders, as described earlier, susceptible of being presented to its field.

Figure 2 illustrates an example of such system of detection. One sees then a group of three transponders P0, P1, P2 and an emitter/receiver E capable of detecting or interrogating them.

The two transponders P1 and P2 are present in the boundaries, described by dotted lines, of the radio field B emitted by the emitter E.

Each transponder comprises an antenna, represented for instance in figure 2 in the form of a resonant circuit having an inductance, capacitance, charge and electronic circuit.

Preferably, this antenna serves to receive the radio field and its power as well as the radio signals transmitted by modulating the field B. In this case, the field and the signals have the same frequency called determined frequency fe.

One can also anticipate that the field and the signals have distinct frequencies, the antenna of the transponder receiving the signals of the determined frequency emanating from the emitter E and the electronic circuit of the transponder receiving a field B of any frequency and power.

One can also anticipate that the antenna of the transponder emits signals of the determined frequency aimed for the receiver E, while an electronic circuit of the transponder receives separately the field B of any frequency.

Each transponder comprises thus an antenna capable of transmitting radio frequency signals between the emitter/receiver E and the transponder.

When the transponders P1 and P2, according to the invention, are in the field B, the transponder P1 can be mismatched or detuned. One avoids this way any perturbation of transmission between the emitter/receiver E and the transponder P2 by the other transponder P1 present in the field B.

Also, in another step of the transmission protocol, the transponder P2 can be mismatched to avoid any perturbation of transmission between the emitter/receiver E and the transponder P1.

To go into this other step, it is preferable to have the emitter/receiver sends an instruction of selection to one transponder among the group of transponders present in the field. This instruction signal can for instance be the identification code of the transponder. The transponder in question goes then, preferably, into a selected state after this instruction coming from the radio emitter/receiver.

Lastly, the invention anticipates that the system detection/interrogation comprises an emitter with a frequency sweep in a reduced space.

This disposition is advantageous when one uses transponders whose antenna can be detuned in frequency. In this manner a transponder that would not have been detected or read during the interrogation period can be detected during this phase of frequency sweep.

According to the previous example, if the determined frequency fe, nearly equal to fa over which the antenna of the matched transponder is tuned, is 130 kHz, the emitter-receiver can comprise a frequency sweep over the space of 130 kHz-160 kHz. The frequency space contains thus the resonant frequency fa of the matched antennas and the resonant frequency fd of the mismatched antennas.

The operating mode of the transponders described earlier, predicts that the emitter generates a unique radio field having a determined frequency, this field eventually transmitting information to a transponder such as an interrogation or initialization signal

in the form of radio signals. This radio signal is preferably a simple modulation of the radio field.

In general, the invention can be realized with a transponder comprising a device of power reception distinct from the system of reception of radio signals.

In addition in the previous applications, we discussed only that fact that the antenna of the transponders was mismatched to avoid absorbing the radio field or signal of the emitter.

But in a more general manner the response signals sent by a transponder to the emitter/receiver can also be absorbed by neighboring transponders. This effect is more annoying when the transponder disposes generally of a weak power for such re-emission.

It is thus advantageous to anticipate that the other transponders be mismatched to avoid absorbing the response signal re-emitted by the transponder.

Thus, in general, the invention anticipates a transponder susceptible of being presented to a radio-electric field, said transponder comprises an electronic circuit capable of absorbing and restituting power supplied by such field, and an antenna capable of transmitting radio-electric signals of a determined frequency, particularly characterized by the fact that the antenna comprises means of mismatching to the transmission of determined frequency signals and means of matching to the transmission of the determined frequency signals, the means of matching of the antenna being activated when the transponder is in a selected state, the means of mismatching of the antenna activated when the transponder is a non selected state such that the non selected transponder presents a limited absorption of the radio-electric signals of the determined frequency.

The invention can be advantageously applied in a transmission system comprising a reader or detector designed to read information on labels or to detect objects comprising such labels. This system applies in particular to commercial applications, for instance to trace products or track inventory, the labels containing price information, identification, or corresponding product quantities.

Other applications and variations of modes of practice are available to the one skilled in the art without straying away from the invention.

CLAIMS

1- A transponder P1 susceptible of being presented to a radio-electric field B, said transponder P1 comprises an electronic circuit D capable of absorbing and restituting power supplied by such field, and an antenna (L, C1, C2) capable of transmitting radio-electric signals of a determined frequency, characterized by the fact the antenna comprises means of mismatching a transmission of signals of the determined frequency and means of mismatching to the transmission of the signals of the determined frequency, the means of matching of the antenna being activated when the transponder is in a selected state, the means of mismatching of the antenna being activated when the transponder is a non selected state such as that the non selected transponder P1 presents a limited absorption of radio-electric signals of the determined frequency.

2- A transponder According to claim 1, susceptible of being presented to a radio-electric field of a determined frequency, said transponder P1 comprises an antenna (L, C1, C2) capable of receiving the radio-electric field B of a determined frequency and an electronic circuit D coupled to the antenna (L, C1, C2), the circuit absorbing and restituting power supplied by the field received by the antenna and that the transponder comprises means of mismatching (V1, R) to a transmission of a radio-electric field of a determined frequency and means of matching (V1, I1, R, I) to the reception of the radio-electric field of the determined frequency, the means of of matching being activated when the transponder is in a selected state, the means of mismatching being activated when the transponder is in a non selected state to limit the absorption of the power and/or field B' by the transponder P1 in the non selected state.

3- A transponder according to any of the previous claims, characterized by the fact that the means of matching (V1) permit tuning the antenna to determined radio-electric frequency, and that the means of mismatching (V1, I1) permit detuning of the antenna with respect to the determined radio-electric frequency.

4- A transponder according to any of the previous claims, characterized by the fact that the means of matching (V1) and/or mismatching (V1, I1) consist of varying a

capacitance value (C1+C2+V1), the antenna having an inductance value L such that the tuning frequency of the antenna is varied with respect to the determined frequency of the radio-electric signals.

5- A transponder according to any of the previous claims, characterized by the fact that the means of matching R and/or mismatching (R, I) permit varying the matching of the impedance between the antenna and the electronic circuit.

6- A transponder according to any of the previous claims, characterized by the fact that the means of matching and/or mismatching consist of varying a value of charge and/or resistance R in order to vary the value of the impedance of the antenna (L, C1, C2) and/or the value of the impedance of the electronic circuit D.

7- A group of transponders according to any of the previous claims, characterized by the fact that when two transponders P1 and P2 are presented to a radio-electric field, each of the transponders P2 receives the radio-electric field and/or signals of the determined frequency no matter what the position of the transponder P2 with respect to the other transponder P1, each transponder comprising means of matching and mismatching to avoid the radio-electric perturbations caused by the proximity of the other transponder.

8- A group of transponders according to any of the previous claims, characterized by the fact that the transponders go into a selected state in turns, one transponder or a small number of transponders being selected at a given time.

9- A group of transponders according to any of the previous claims, characterized by the fact that a transponder goes into a non selected state during the period of temporal inhibition of the transponder.

10- A detection and/or interrogation system comprising a radio-electric emitter/receiver E and a plurality of transponders (P1, P2) susceptible of being presented

to a radio-electric field B emitted by the emitter/receiver E. each transponder comprising an antenna (L,C) capable of transmitting signals of a determined radio-electric frequency between the emitter/receiver E and the transponder, the system being characterized by the fact that it comprises transponders according to any of the previous claims to avoid the perturbation of a transmission between the emitter/receiver and a given transponder by other transponders being presented to the radio-electric field.

11- A system according to claim 10, characterized by the fact that the radio-electric emitter/receiver comprises a frequency sweeper in a space around the determined frequency such that a transponder in a non selected state absorbs power supplied by the field emitted by the emitter/receiver and goes into a selected state such that the transponder become selected or interrogated.

12- A system according to claim 11, characterized by the fact that the transponder goes into a selected state after receiving a command from the radio-electric emitter/receiver

Translated by: Hassan Sahouani, 737 2552.

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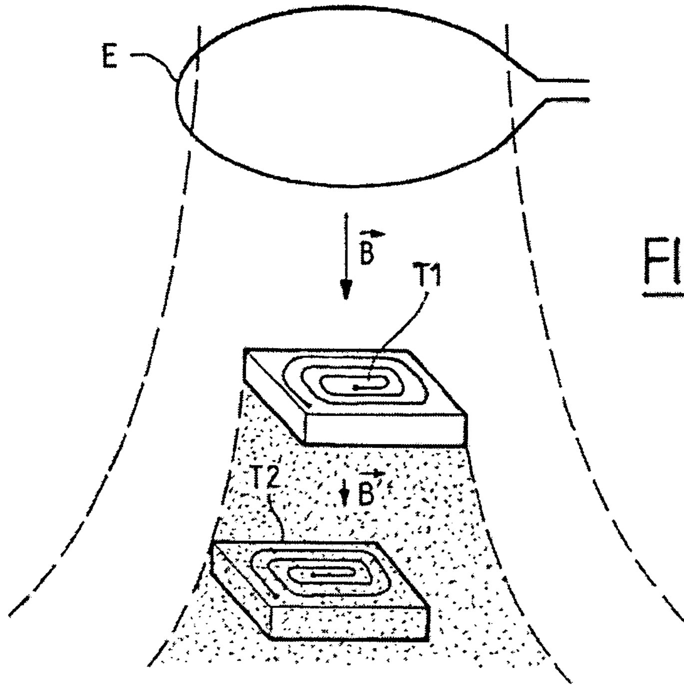

FIG_1

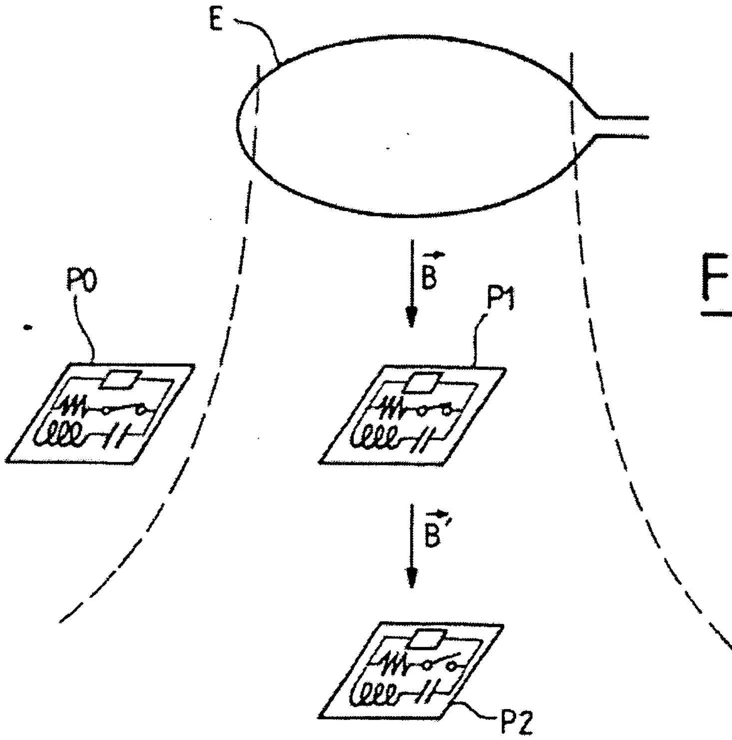

FIG_2

FIG_3

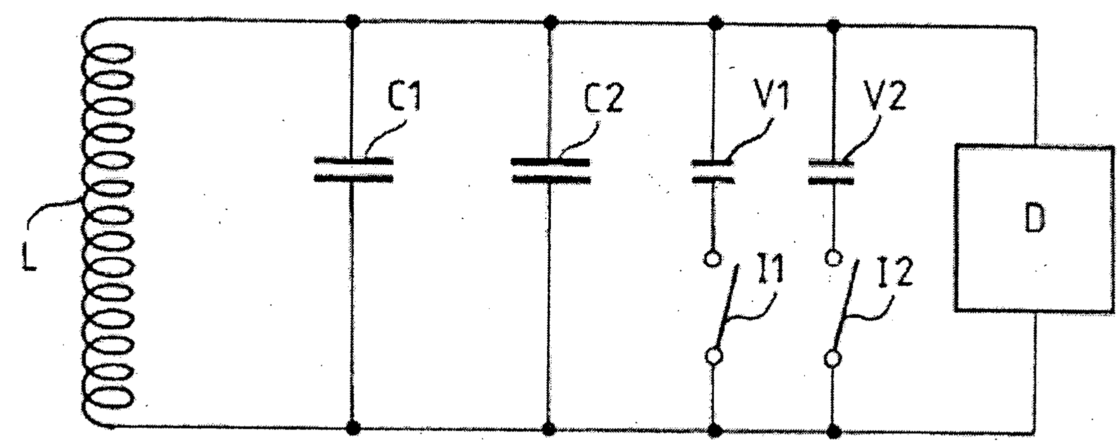

FIG_4